

Department of Water Supply Hydrogenerator Program

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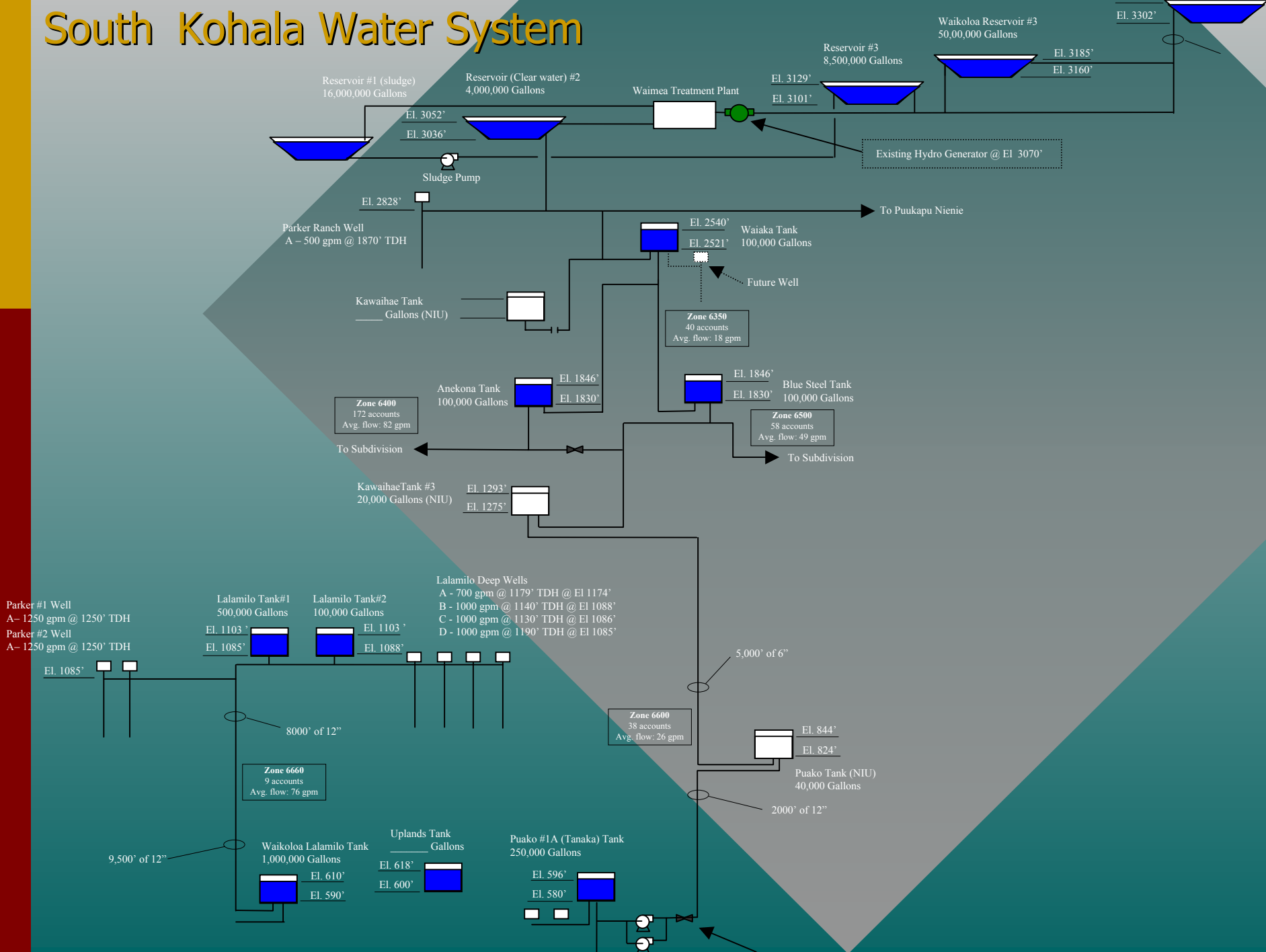
Introduction

- What is a hydrogenerator?
- Existing Waimea Treatment Plant Hydro
- New Islandwide Hydro Study

What is a hydrogenerator?

- A machine that converts high pressure water to mechanical energy.
- Mechanical energy is then used to drive an electrical generator for power generation.

South Kohala Water System



Waimea Treatment Plant Hydrogenerator



Waimea Treatment Plant Hydrogenerator

- 30 Kw Byron Jackson Unit
- Produces on average 14,000 kwhrs/month
- Annual Average Energy Savings of \$17,000.00
- Excess sold to Helco for \$ 3200.00/year

Islandwide Hydrogenerator Study

Table 1.1
EVALUATION ECONOMIC SUMMARY
County of Hawaii

Revenue

Annual revenue from new hydro systems based on HELCO
“buyback” rate (\$0.066/kWh) \$232,760

Project Costs

Estimated cost \$1,617,000

Financial

Simple payback 6.9 years

Present value based on LCC over 20 years \$1,044,850

Reduced Plant Fuel and Emissions Based on Hawaii Power Sources

Estimated barrels of oil saved annually 5900 barrels/year

Carbon dioxide (1364 lbs/MWh)	4,816,000	lbs/year
Sulfur dioxide (.008 lbs/MWh)	28	lbs/year
Nitrous oxides (.921 lbs/MWh)	3250	lbs/year

Pressure Reducing Valve Station



Pressure Reducing Valve



Potential Sites

- Kona
 - Kaloko Control to #2(64kw, 35kw, & 35kw)
 - Palani #1 to #4(13kw, 15kw, & 2 each 17kw)
 - Kahaluu Shaft (32kw)
- Hilo
 - Piihonua #2 (13kw)
- South Kohala
 - Lalamilo (100kw & 70kw)
 - Waimea Treatment Plant (efficient 28kw)
- Total Capacity of 439 kw

Kaloko #2 Booster Station



Lalamilo Tank Site



Pelton Hydrogenerator



Power Cost Adjustment Clause

- Allows DWS to pass Helco rate increases or decreases to the customer.
- Does not allow for investment in capital costs to get energy savings.
- Hydro projects bring income

Implementation Plan Options

- Partnership with Helco
 - \$20,000 Grant from Helco for a pilot study
 - Full implementation (Royalty System)
- Go it alone with a Performance Contract

Conclusion

- DWS has the experience and expertise.
- Large capital costs but savings are real.
- Support Net-Metering -retail rates
 - increase capacity to 100kw
 - retail rates (Idaho, Wisconsin, New Mexico, etc.)
 - paybacks for the County could be 3 times faster!